

The fetal umbilical artery Doppler as a tool for universal third trimester screening

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Objective

The fetal umbilical artery (UA) Doppler is routinely used for monitoring high risk pregnancies. The objective of this study is to investigate the accuracy of universal UA Doppler to predict adverse pregnancy outcome at term.

Methods

We analysed data from a prospective cohort study of nulliparous women, the Pregnancy Outcome Prediction study. All women had research scan at about 36 weeks gestation which was blinded to clinicians. Screen positive was defined as UA-PI above the 90th centile. We also searched Medline, EMBASE and the Cochrane library from inception to November 2017. We included studies that used UA Doppler as part of universal third trimester screening or in low-risk pregnancies only.

Results

The analysis included 3615 nulliparous women that delivered after their 36 week scan. The UA-PI was abnormal in 346 (9. 6%). The sensitivity and specificity for predicting any neonatal morbidity (a composite of 5-minute Apgar score <7, neonatal acidosis defined as cord arterial PH <7. 1 and a base deficit of >10mmol/L, or admission to neonatal unit) were 12. 5% (8. 4-16. 6%) and 90. 7% (89. 7-91. 6%) respectively. The positive and negative likelihood ratios were 1. 34 (0. 95-1. 88) and 0. 97 (0. 92-1. 01) respectively. The results were similar for severe neonatal morbidity (a composite of neonatal death, hypoxic ischaemic encephalopathy, use of inotropes, mechanical ventilation, or severe neonatal acidosis defined as cord arterial PH <7. 0 and a base deficit of >12mmol/L). Excluding the pregnancies with EFW <10th centile at 36 weeks resulted in even lower sensitivity and positive likelihood ratio. From the systematic review we identified 11 studies including 16, 938 pregnancies in total. The summary sensitivity and specificity for predicting NICU admission were 14. 7% (5. 8-32. 7%) and 89. 7% (80. 3-94. 8%), respectively. The positive likelihood ratio was 1. 42 (0. 82-2. 47) and 0. 95 (0. 86-1. 05), respectively. The results were similar for other neonatal outcomes.

Conclusion

The fetal umbilical artery Doppler has low predictive accuracy for adverse pregnancy outcomes in unselected pregnancies and should not be used alone for universal third-trimester ultrasound screening.